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HIGHLIGHTS

SPECIAL REPORT

TRENDS IN DEFENSE PROCUREMENT

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* TRENDS IN MILITARY PROCUREMENT -- A Special Report

Here is a selected digest of trends in military procurement based upon information newly released by the military services through the Committee on Appropriations, Subcommittee on Department of Defense, U. S. House of Representatives, Washington 25, D. C. in hearings on Procurement plans for the Fiscal Year which begins July 1, 1961.

* BATTLEFIELD ILLUMINATION ROCKET: The Army has a requirement for a sophisticated rocket system to provide battlefield illumination. Review has disclosed however, that the characteristics originally established demand accuracy beyond that considered absolutely essential. The military characteristics are therefore now being revised to provide a lesser degree of accuracy of delivery -- permitting a simpler rocket and a less costly ground launching system.

* CLAYMORE: The Army intends to use some of its new appropriation funds for purchase of the directional fragmentation M181 Claymore antipersonnel mine. Production engineering studies indicated that certain parts could be produced from plastic rather than steel, other parts from less expensive plastics, and that 13 parts could be eliminated altogether. The cost of the mine was reduced as a result of this study from about $36 to less than $26 each.

* REDEYE: Censored information indicates that the Army decided in late April, 1961 not to spend the $11.4 million allocated for production of this man-carried infrared-homing antiaircraft missile during the current Fiscal Year. The delay in procurement is attributed to technical difficulties. Reduced funds are being requested for further pre-production testing. However, Army officials express confidence that these tests will prove satisfactory and that the missile will be "standardized" for production and procurement in the new Fiscal Year.

* DAVY CROCKETT: A "reorientation" program is apparently taking place in this transportable nuclear battlefield weapon which has been highly touted by Army officials in the past. Procurement plans are being reduced "pending completion and evaluation of test results" which appear to be mainly concerned with the cost of this weapon, and "also the numbers of people that would be required in special platoons." Funds in connection with production facilities have been canceled. A total of $1.730 million in research funds have been spent to date.

* MULTIFUEL ENGINES: The Army, after extensive testing, is apparently moving more quickly into multifuel engines for its larger vehicles. A $1 million letter contract was signed in April, 1961 with the Continental Motors Corp. for procurement of an unspecified number of engines. Army officials indicate that all trucks and tactical vehicles of 2½ tons capacity or greater will eventually come equipped with multifuel engines.

(Continued)

* DASH SYSTEM: The Navy has put in the public record some of the high-level doubts as to the operational reliability of its Dash drone helicopter weapon delivery system designed for use from destroyers and other small antisubmarine warfare (ASW) ships. The system has been in dispute for many months between the aircraft and weapons sections of the Navy.

Vice Admiral R. B. Pirie, Deputy Chief of Naval Operations (Air), told the House Military Appropriations Committee "there is a lot of controversy as to whether this thing can stand up in heavy weather or not, among some of us who have seen a lot of salt water run over top of ships. The doubt I have in my mind is that it will not operate in very heavy weather. I think it will operate in good weather, and maybe moderate weather. I have told everybody connected with it I do not think any drone helicopter or drone flying machine will do that."

Slippage: Navy officials, who have recently ordered the Dash system into production, estimate that the program has "slipped" by about eight or nine months "due largely to an overambitious original schedule." They state that Fleet delivery will start in July of 1962 and that "We have had some troubles but nothing particularly unusual for an R&D program."

Losses: In the first (DSN-1) version of the Dash system some 17 successful flights were accomplished. Of the first group of nine DSN-1, four crashed and five remain in the program. In the new version, DSN-3, powered by a Boeing T-50 gas turbine engine, the Navy is programming forty percent losses per year for peacetime operations and training. Navy officials testified that one DSN-3 has been built by Gyrodyne Co. of America and was first flown April 6, 1961. The operational evaluation of the Dash concept was completed successfully by the Navy on March 24, 1961.

Fuel Problem: Testimony and statements indicate that the Navy officials in charge of the Dash program may have been proceeding on a system which used aviation gasoline for fuel without realizing that officials in charge of the shipbuilding program had ordered a stop to installation of aviation gasoline facilities in destroyer-type ships. In the interim, at least two destroyers were being modernized for the Dash system using aviation gasoline and had to be changed to employ JP-5 fuel, at an estimated cost of $64,000. The DSN-1 and DSN-2 versions both used aviation gasoline.

Chairman George H. Mahon of the House Subcommittee stated:

"In April and June of 1959, as I understand, the Navy executed contract changes to make the test vehicle DSN-1 and DSN-2, tactical fleet vehicles. Apparently this was done without the knowledge of the aviation gasoline storage change. Is it true that the field representative of the Navy at the prime contractor's plant was not formally advised of the change until December of 1959, and a major subcontractor working on the automatic pilot and flight control system was not informed until February of 1960?" Navy officials did not specifically answer the questions, but denied any "poor management" was involved.

* HOT CYCLE PROPULSION SYSTEM: A new helicopter system developed by the Hughes Aircraft Co. is undergoing military test. The principle of the system "is to provide hot gases from turbine engines to go from the engine through the rotor blades and exhaust out through the tips of the rotor blades. The exhaust through the tips of the rotor blades then drives the blades through the air." A test model is expected to go through 50 hours without a breakdown. If this effort, now underway, is successful, officials hope to build a rudimentary flying model in 1962 and 1963. Officials state that "if the engine works, it will reduce the number of moving parts in the drive mechanism" and will reduce costs by a considerable amount.

* DOPPLER NAVIGATOR: The Army, purchasing Doppler navigation equipment for its Mohawk aircraft, plans to use such equipment only when a position must be pinpointed over unfriendly or unknown territory. In many airplane and helicopter systems, such as the new light helicopter now being developed, such equipment is not considered necessary "because we will be operating mostly in known territory where it will be possible to establish position by reference to good maps or known locations on the ground." The Doppler system will be tested for various helicopters, but would likely be used only in so-called "Pathfinder" craft -- about one in every group of five or ten machines.

* MOHAWK REDESIGN: Army and Navy officials have apparently rejected a proposal by Grumman Aircraft for redesign of the present Mohawk aircraft to accommodate a wider variety of missions and flexibility by permitting change of various electronic sensory equipment by field maintenance units. The Army states that such a change "would result in an extensive and unfunded development and test program, a significant weight increase...a reduction in performance, stability and control, and reduced crew protection, and only marginal crew escape provisions."

* TRANSIT PROGRAM: The Navy has spent $54.55 million in its Transit navigation satellite system from inception through the end of the current Fiscal Year. Of this sum, $31 million is attributed to launching vehicle costs. The Fiscal 1962 procurement totals $4.8 million for four Scout-type boosters and six satellites.

The Navy states that research and development work on the Transit satellite has resulted in a prototype operational design that can be launched by a Scout vehicle. This design represents a weight reduction from 250 pounds to 90 pounds, as well as significant increases in electrical power and satellite memory capacity over the earlier 250-pound experimental versions. While several of the satellite subsystems are now specified in detail, final design specifications for the complete 90-pound operational satellite will not be released until prototype versions are launched and evaluated under orbital conditions.

Officials state that equipment performance requirements for Transit operational systems have been documented. The detailed design specifications for the complete system equipments are being defined on a continuing schedule as rapidly as preprototype and prototype equipments can be evaluated experimentally.

The relatively small number of subsystem equipments, such as satellites will not, it is pointed out, require typical mass production techniques to be employed for complete subsystems. Therefore, at least initially, component and subassembly procurement will be used for satellite construction. This approach utilizes staggered procurement actions to correspond to lead times associated with individual components or subassemblies.

While operational equipment procurement, including satellites, boosters, etc., will be initiated in 1962, the small quantities of satellites and support equipment may be laboratory (model shop) constructed. Later production type units are expected to be procured in accordance with standard procedures.

The Transit development program is scheduled to provide an operational capability commencing in the Fall of 1962, with prototype operational navigational excercises to commence this Summer.

* TERNE: The Navy is proceeding with procurement of the Norwegian-developed antisubmarine lightweight weapon Terne, a rocket-propelled device which has several types of fusing and can be used on small ships.

* TURBOFAN ENGINES: The Air Force estimates that $21.2 million is necessary to equip 15 of its C-135 transport aircraft with turbofan engines. Among specific advantages listed by the Air Force are:

✓ Access to many more airfields because of reduced take-off distance. Total airfields available to the C-135 worldwide would increase 20 percent. More important, the Air Force states, those available in Africa, Asia and the Middle East would increase 318 percent from 11 to 35 airfields.

✓ Higher payloads would be carried over longer distances because of lower fuel consumption.

✓ Aircraft would be less susceptible to power loss, which is especially important under hot weather takeoff conditions. In addition, a better range of safety would be provided through reduced landing distance.

* HOUND DOG MISSILE: Air Force officials state that over 100 changes were recently found to be required on the Hound Dog missile system carried by late model B-52 bombers for so-called "stand-off" missions. Most of the changes were minor in nature. The guidance system is described as "the principle problem area" but results of subsequent tests are said to be "very encouraging." Minor difficulties encountered included such items as terminal connections, shielding against random noise, etc.

A major modification program appears to be planned for the Pratt and Whitney J-52 turbojet engines used in the Hound Dog. Officials state that "we are hoping to be able to modify the engine so you can start them on the ground without an external power source. The way they operate now, you can shut them down or start them again as desired during the flight of the aircraft. They can run all the time at idle speed after the aircraft takes off. A cartridge starter modification could allow you to start them on the ground for test, without utilizing external power sources."

Note: The Air Force estimates that procurement costs of a single Hound Dog missile, excluding the nuclear warhead is $534,000 in Fiscal 1961 and about $519,000 in the 1962 Budget.

* "L" SYSTEMS: Here is a summary of planned Air Force procurement in the command and control systems field for the new Fiscal Year:

System 412 L, tactical aircraft control and warning.....$32.0 million
System 416 L, continental aircraft control and warning.....$142.0 million
System 425 L, NORAD combat operations center.....$12.3 million
System 431 L, traffic control and landing.....$10.3 million
System 443 L, weather observation and forecast.....$7.7 million
System 465 L, SAC control.....$53.5 million
System 466 L, Electromagnetic intelligence.....$17.4 million
System 474 L, ballistic missile early warning.....$34.5 million
System 480 L, air communications.....$60.6 million

Cryptographic equipment, also associated with this type of program, is budgeted at $32.8 million. The bulk of items in this area are encryption-decryption devices, which provide traffic security as well as message content security for the three general types of transmission media -- printed messages (teletype, facsimile, etc.) voice, and data.

* QUASI-EARTH COMMUNICATIONS SYSTEM: Beginning with the Air Force's seventh Minuteman squadron a quasi-earth current communications system is planned which is expected to provide communications between various missile sites at something less than half the cost of buried cable. Officials state that "we do not know unequivocally at this time as to its reliability but it looks very good up to this time."

* AIR FORCE "DEVELOPMENT SUPPORT" GROUPS

The Air Force plans to spend some $112.9 million in the new Fiscal Year for its so-called "development support" groups, which are under contract to provide "specialized technical and scientific efforts necessary to supplement that available within the Air Force." These are:

✓ Rand Corp., which will receive $11.6 million, as compared to $13.5 million in Fiscal 1961. Rand performs technical studies and research on Air Force warfare and weapon systems problems and recommends to the Air Force "preferred methods, techniques and instrumentalities for the development and employment of Aerospace power."

✓ Analytic Services, Inc., will receive $1 million, as it did in Fiscal 1961. The organization, better known as Anser, is a "small analytical group which was organized to provide objective technical evaluations for the Director of Development Planning, and to be immediately responsive to changing requirements."

✓ Lincoln Laboratory, will receive $15.3 million, compared to $14.6 million "to pursue their program of research and development in the field of advanced electronics, including the development and production of test components necessary to implement such research and development." The Lincoln Laboratory support of all agencies of the Department of Defense covers the areas of solid-state electronics, penetration aids, communications, radar, ballistic missile defense, radio physics and orbital scatter circuits.

✓ Mitre Corp., will receive $15 million, as compared with $22.9 million "as the principle systems adviser to the Electronics Systems Division of the Air Force Systems Command." Mitre's efforts include studies, analysis and tests of future air defense systems, development of systems specifications, and design verification studies and tests.

✓ Space Technology Laboratories, which has been changing its role as a "think" organization to a "hardware" producer, will receive $34.8 million, as compared to $41.6 million "to provide detailed systems engineering and technical direction of the Atlas, Titan, Minuteman missile programs."

✓ Aerospace Corp., set up by the Air Force to take over some former functions of Space Technology Laboratories, will receive $35.2 million, as compared to $26.4 million "for advanced systems analysis and planning, research and experimentation, initial systems engineering and technical direction, technical monitoring of space systems and other support of the Ballistic Systems Division and the Space Systems Division." Aerospace Corp. is currently active in the Samos, Midas, Discoverer, Dyna-Soar, Saint and Nike-Zeus programs, among others.

* CHINOOK HELICOPTER: Army officials state that they plan a $16 million, 5-year product improvement program for the Chinook helicopter to "improve the dynamic components" so that they will be capable of 1,200 hours of operation between overhaul and have a minimum service life of 3,600 hours. Since this program may result in the procurement of a lesser number of major components, the Army has been studying proposals to fund the entire program in just two years. Officials state the first of five "Y" models from Fiscal Year 1959 R&D procurement was rolled out on April 28, 1961 for ground and static tests, with the first flight planned for July 1961. According to present plans, the Chinook will be type classified "standard A" by the third quarter of Fiscal Year, 1963.

# P U B L I C A T I O N  C H E C K L I S T

- ATOMIC ENERGY INDUSTRY, the complete text of testimony, statements and exhibits from Government, Industrial and related organizations on the so-called "202" hearings relating to the Development, Growth and State of the Atomic Energy Industry. 806 Pages. (Write Joint Committee on Atomic Energy, F-88, The Capitol, Washington 25, D. C. regarding "202' Hearings)

- LIQUID HYDROGEN HAZARDS, a review of research on the hazards associated with the production and handling of liquid hydrogen. 50 Pages. Single Copies Free. (Write Publication-Distribution Section, U. S. Bureau of Mines, 4800 Forbes Avenue, Pittsburgh 13, Pa. for Report of Investigation No. 5707)

- EMITTANCE OF COATED MATERIALS, a compilation of original test data on emittance and reflectance of coated materials for use at elevated temperatures. 135 Pages. Single Copies Free to Government agencies, their contractors, subcontractors and suppliers. (Write Defense Metals Information Center, Battelle Memorial Institute, Columbus 1, Ohio for DMIC Memorandum No. 103)

- DIGITAL RECORDING SYSTEM, a technical account of a system for recording satellite tracking data as received by the Minitrack system, on five-level punched paper, at a rate of 100 characters per second. 23 Pages. Single Copies Free. (Write National Aeronautics and Space Administration, ATTN: CODE BID, 1520 H Street, N. W., Washington 25, D. C. regarding NASA TN D-672)

- NSF PROGRAMS FOR EDUCATION IN THE SCIENCES, a review of the variety of Fellowship, Institute and Special Projects in Science Education sponsored by the National Science Foundation. Contains detailed information on submission of proposals, nominations, etc. 34 Pages. Single Copies Free. (Limited Supply available from Service Department, Washington SCIENCE TRENDS, National Press Bldg., Washington 4, D. C.)

- FAA RESEARCH AND DEVELOPMENT, a relatively non-technical review of 18 months of research and development in a number of aviation fields sponsored by the Federal Aviation Agency. 63 Pages. 30 Cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D. C. for "FAA Research and Development Progress Report")

- ZERO-G DEVICES AND WEIGHTLESSNESS SIMULATORS, a review of a wide variety of devices for producing Zero-G conditions including vertical motion devices, aircraft and ballistic missiles as well as a summary of various proposed and existing weightlessness simulators. 147 Pages. (Write Publications Office, National Academy of Sciences, 2101 Constitution Avenue, N. W., Washington 25, D. C. for Publication No. 781)

- J-79 ENGINE, a second printing, for non-military distribution of the 1958 research report on the General Electric Co. turbojet engine and its components. 56 Pages. Single Copies Free. (Write National Aeronautics and Space Administration, 1520 H Street, N. W., Washington 25, D. C. for NASA Research Memorandum E58c12)

- NASA AUTHORIZATION HEARINGS, a highly detailed transcript of testimony, statements, exhibits and charts on all phases of the National Aeronautics and Space Administration program for 1962. This is the closest approach to an encyclopedia of the space agency. Two Volumes. 1034 Pages. (Write Committee on Science and Astronautics, New House Office Building, Washington 25, D. C. regarding "NASA Authorization Hearings--1962")